

## UCH834 PROCESS INTEGRATION

<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>3.5</b>

### Course Objectives:

To understand the energy and mass targets in design of processes.

**Introduction:** Process integration, Role of thermodynamics in process design, Concept of pinch technology and its application.

**Heat exchanger networks:** Heat exchanger networks analysis, Simple design for maximum energy recovery, Loop Breaking & Path Relaxation, Targeting of energy, area, number of units and cost, Trading off energy against capital.

**Network Integration:** Super targeting, maximum energy recovery (MER), Network for multiple utilities and multiple pinches, Grand Composite curve (GCC).

**Mass integration:** Distillation sequences.

**Heat and Power Integration:** Columns, Evaporators, Dryers, and reactors.

**Case studies:** Waste and waste water minimization, Flue gas emission targeting.

### Course Learning Outcomes (CLO):

Upon completion of this course, the students will be able to:

1. understand of the fundamentals of process integration.
2. perform pinch analysis.
3. analyze and design heat exchanger networks.
4. minimize the water consumption and waste generation.

### Text Books:

1. Linnhoff, D.W., *User Guide on Process Integration for the Efficient Use of Energy, Institution of Chemical Engineers (1994).*
2. Smith, R., *Chemical Process Design and Integration, John Wiley & Sons(2005).*

### Reference Books:

1. Shenoy, V. U., *Heat Exchanger network synthesis, Gulf Publishing (1995).*
2. Kumar, A., *Chemical Process Synthesis and Engineering Design, Tata McGraw Hill (1977).*

### Evaluation Scheme:

S. No.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	45
3	Sessional (May includes tutorials/ assignments/ quiz's etc)	25